Radio Frequency Micro Ion Thruster for Precision Propulsion, Phase I

Completed Technology Project (2005 - 2005)

Project Introduction

Busek proposes to develop radio frequency discharge, gridded micro-ion thruster that produces sub-mN thrust precisely adjustable over a wide dynamic thrust range. Such propulsion is needed to augment and overlap the present micro Newton propulsion such as colloid thruster. The RF was selected to eliminate the internal cathode of the DC discharge ion thrusters. This cathode could be a life limiting component and consumes propellant. Two types of neutralizers are candidates for the proposed thruster and include Busek's carbon nanotube field emission cathode similar to that developed for the ST7 DRS mission and already demonstrated RF discharge cathode which consumes much less flow than comparable hollow cathode. The performance of the proposed RF micro-ion thruster is expected to approach that of the NASA JPL MiXI which represents the state of the art in small ion thrusters with DC discharge. In Phase 1 the RF micro-ion thruster will be build and tested and second generation laboratory device will be designed. MIT, our subcontractor, will initiate the development the RF thruster numerical model to support the experimental effort. In Phase 2 the thruster system will be constructed and demonstrated including the optimized thruster, neutralizer, key parts of the PPU and the feed system.

Primary U.S. Work Locations and Key Partners

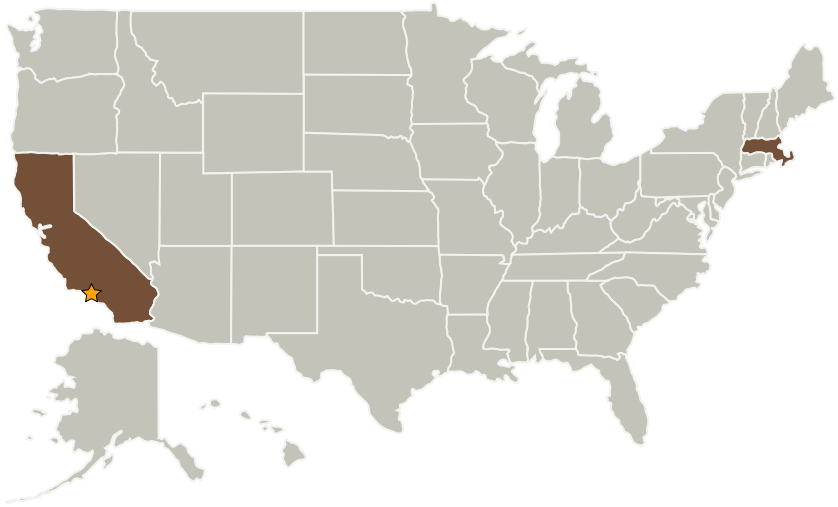

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Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Organizational Responsibility	1
Project Management	2
Technology Areas	2

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California
Busek Company, Inc.	Supporting Organization	Industry Women-Owned Small Business (WOSB)	Natick, Massachusetts

Primary U.S. Work Locations	
California	Massachusetts

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Kurt Hohman

Technology Areas

Primary:

- TX01 Propulsion Systems
  - TX01.2 Electric Space Propulsion
    - TX01.2.2 Electrostatic